Background

Multiple ways to convey the same thought in English
- Active sentence: The pig was kissing the sheep.
- Passive sentence: The sheep was kissed by the pig.
- Temporary syntactic ambiguity “The pig was kiss” is resolved as sentence unfolds

Stromswold et al. (under review)
- Linguistically-trained adult said verb stems longer in passives than in actives (mean difference ~ 33 ms)
- Adults could predict syntactic structure before hearing verb ending –ed or –ing

Rehrig et al. (2015)
- Naive adult English speakers also lengthen passive verbs
- Passive verb stem lengthening is a robust phenomenon

Materials & Methods

Stimuli
- Audio recordings of participant from Rehrig et al.’s production study
  - 32 Actives: The _____ was _____ing the _____.
  - 32 Passives: The _____ was _____ed by the _____.

Adult Study: 7 participants
- Comprehension Gating Task: listen to truncated sentences and guess how they end “The pig was kiss”
  - The pig was kissing the sheep.
  - The pig was kissed by the sheep.
- Production Task: read sentences aloud

Child Study: 5 children ages 3, 3, 4, 4, and 10
- Comprehension Task: listen to complete sentences and select the matching picture
  - “The pig was kissing the sheep”
- Production Task (elicited imitation): repeat auditorily presented sentences
  - Recorded at 44.1 KHz
  - Production data was manually segmented in Praat to determine durations

Questions
- Is there a relationship between how people produce and process sentences?
  - Is there a relationship between degree of lengthening and comprehension?
  - Do children who lengthen verb stems more comprehend passives more easily?
  - Do children use the same acoustic cues as adults to process sentences?

Results

Adult Findings

- 7 subjects
- Main effect of syntax: Duration of active verb stems > passive verb stems \( F(1, 46) = 59.57, p < .0005 \)
- Adults were better at guessing short active verb stems and long passive verb stems \( F(1, 13) = 18.25, p < .001 \)
  - Correct active stems < incorrect active stems \( F(1, 286) = 3.14, p = .077 \)
  - Correct passive stems > incorrect passive stems \( F(1, 286) = 4.825, p = .029 \)
- Degree of lengthening/shortening of particular verb stems was correlated with ability to predict syntactic structure for that sentence \( (r(448) = .38, p < .0005) \)

Child Findings

- 5 subjects ages 3, 3, 4, 4, and 10
- Four year old’s production:
  - Passive verb stems 44 ms > than active stems \( F(1, 28) = 2.38, p = .087 \) by one-tailed test
- Accuracy by age:
  - 3 and 4 years: 75% accurate on actives and 53% accurate on passives.
  - 10 year old: 100% accurate on actives and passives.

Discussion

- All adults (7) and children (1) lengthened passive verb stems.
- Adults were accurate on short active verb stems and long passive verb stems.
- Stimulus verb stem length did not affect children’s accuracy.
- Children’s accuracy was affected by their age:
  - 3 and 4 year olds were 75% accurate on actives and 53% accurate on passives.
  - The ten year old was 100% accurate on actives and passives.

Implications
- Adults used verb stem length to predict syntactic structure.
- Too few child participants to draw conclusions
  - Children tested were not sensitive to verb stem length.
  - Children tested have not yet developed the cognitive ability to use acoustic cues to predict syntactic structure.
  - Children may produce acoustic cues before they can use them.

Future Directions

- Test children within the 4-10 age range.
- Use different methods to collect production data from children.
- When do children begin to use verb stem duration in sentence comprehension?

References


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